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| 10/598,703 | 09/08/2006 | Vasilis Ntziachristos | MGH-048AUS | 9134 |
| 22494 7590 10/07/2008 DALY, CROWLEY, MOFFORD & DURKEE, LLP SUITE 301A 354A TURNPIKE STREET CANTON, MA 02021-2714 | | | | |
| EXAMINER | | | | |
| BAKER, DAVID S | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@dc-m.com
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Office Action Summary

Application No.

10/598,703

Applicant(s)

NTZIACHRISTOS ET AL.

Examiner

DAVID S. BAKER

Art Unit

2884

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2006.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-45 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 08 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/85/08)
Paper No(s)/Mail Date 09/08/06, 02/12/08
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-7, 9-11, 13, 19-26, 28-30, 32, 38-39, and 44-45 are rejected under 35

U.S.C. 102(b) as being anticipated by Ntziachristos (WO 2002/041760 A2).

Regarding claims 1 and 21, Ntziachristos discloses a system and method for optical tomography comprising: generating an excitation light with an apparent light source adapted to project the excitation light toward a specimen (P:3 L:11-22) having fluorescent proteins therein (P:13 L:5-18); wherein the excitation light enters the specimen becoming intrinsic light within the specimen (P:18 L:15-31); wherein the intrinsic light is adapted to excite fluorescent light from the fluorescent proteins (P:18 L:15-31), and the wherein intrinsic light and the emitted light have wavelengths in the visible wavelength region (P:18 L:15-31).

Regarding claims 2 and 22, Ntziachristos discloses that the intrinsic and fluorescent light are diffuse (P:3 L:23 thru P:4 L:6).

Regarding claims 3 and 23, Ntziachristos discloses that the fluorescent emission light of the fluorochrome Cy 5.5 is 694nm (P:18 L:15-31).

Regarding claims 4 and 24, Ntziachristos discloses that the fluorescent emission light of the fluorochrome Cy 5.5 is 694nm (P:18 L:15-31).

Regarding claims 5 and 25, Ntziachristos discloses that the fluorescent emission light of the fluorochrome ICG is 800nm (P:18 L:15-31).

Regarding claims 6 and 26, Ntziachristos discloses a light detector receiving the intrinsic light exiting the specimen and adapted for receiving the fluorescent light exiting the specimen (P:3 L:11-22); further adapted for converting the received intrinsic light into first image information (P:3 L:23 thru P:4 L:6); further adapted for converting the received fluorescent light into second image information (P:3 L:23 thru P:4 L:6); and an image processor coupled to the light detector and adapted for generating a visible light in a diffuse medium propagation model (P:15 L:15 thru P:16 L:25); wherein the model is adapted to predict visible light propagation in a diffuse medium; wherein the image processor further combines the first image information, the second image information, and the light propagation model (P:15 L:15 thru P:16 L:25); and further provides a tomographic image of the fluorescent proteins (P:15 L:15 thru P:16 L:25).

Regarding claims 7 and 28, Ntziachristos discloses that an image processor includes a diffusion equation processor wherein a model is generated in accordance with a diffusion equation having a modified coefficient selected in accordance with the visible light propagation model and associated with the intrinsic and the fluorescent light (P:15 L:15 thru P:16 L:25).

Regarding claim 9, Ntziachristos discloses an optical scanner to provide the intrinsic light and fluorescent light to the light detector on a plurality of light paths relative to the specimen (F:2a, F:3a-3f; P:21 L:9-30).

Regarding claims 10 and 29, Ntziachristos discloses that the apparent light source is selectively moved by a light directing device to direct the excitation light on a plurality of light paths toward the specimen (P:18 L:22 thru P:19 L:19).

Regarding claims 11 and 30, Ntziachristos discloses an optical switch selectively moves the apparent light source to provide a plurality of light paths toward the specimen (P:18 L:22 thru P:19 L:19).

Regarding claims 13 and 32, Ntziachristos discloses that the apparent light source is selectively moved by a light directing device to direct the excitation light in translation along a translation axis (F:3a-3f; P:21 L:9-22).

Regarding claims 19 and 38, Ntziachristos discloses that the intrinsic light passes through the specimen as transillumination light (P:2 L:3-13, P:3 L:11-27).

Regarding claims 20 and 39, Ntziachristos discloses that the intrinsic light reflects from the specimen as reflectance light (P:21 L:9-22).

Regarding claims 44-45, Ntziachristos discloses that the intrinsic light or emitted light propagates through the specimen a distance greater than 0.5mm (P:1 L:20 thru P:2 L:13, P:3 L:11-22).

3. Claims 40-42 are rejected under 35 U.S.C. 102(b) as being anticipated by Takada (EP 0336208 A1).

Regarding claim 40, Takada discloses a fluorescent computed tomography system and method comprising: a selectively movable mirror that moves the apparent light source to provide a plurality of light paths toward the specimen (F:1; C:3 L:50 thru C:4 L:5).

Regarding claim 41, Takada discloses a selectively movable mirror that moves the apparent light source to provide a plurality of light paths toward the specimen (F:1; C:3 L:50 thru C:4 L:5).

Regarding claim 42, Takada discloses a selectively movable stage upon which the specimen is located and selectively moved that provides the excitation light on a plurality of light paths relative to the specimen (F:1; C:4 L:6-47).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
6. Claims 8, 12, 14-18, 27, 31, and 33-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ntziachristos (WO 2002/041760 A2) in view of Takada (EP 0336208 A1).

Regarding claims 8 and 27, Ntziachristos discloses the claimed invention but does not disclose expressly selectively movable detector. Ntziachristos discloses that the

apparent light source is selectively moved by a light directing device to move the excitation light on a plurality of light paths toward the specimen (P:18 L:22 thru P:19 L:19). Takada discloses a fluorescent computed tomography system and method comprising: a selectively movable stage upon which the specimen is located and selectively moved that provides the excitation light on a plurality of light paths relative to the specimen (F:1; C:4 L:6-47). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to provide a movable stage as taught by Takada in combination with the selectively movable apparent light source of Ntziachristos. The motivation for doing so would have been to improve the physical range over which the specimen may be examined. The movement between the light source and the specimen versus that of the detector is a matter of apparent motion in different frames of reference. It would be a simple matter of design choice for one of ordinary skill in the art at the time the invention was made to employ a selectively movable light source, specimen, detector, or any combination thereof.

Regarding claims 12 and 31, Ntziachristos discloses the claimed invention but does not disclose expressly a selectively movable mirror. Takada discloses a fluorescent computed tomography system and method comprising: a selectively movable mirror that moves the apparent light source to provide a plurality of light paths toward the specimen (F:1; C:3 L:50 thru C:4 L:5). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to utilize the movable mirror of Takada as a light diverting means in the apparatus of Ntziachristos. The motivation for doing so

would have been to decrease the cost of the light diversion set up since by using a simple mirror rather than an optical switch with several optical fibers.

Regarding claims 14 and 33, Ntziachristos discloses the claimed invention but does not disclose expressly that the specimen is selectively movable to provide the excitation light on a plurality of light paths relative to the specimen. Takada discloses a fluorescent computed tomography system and method comprising: a selectively movable stage upon which the specimen is located and selectively moved that provides the excitation light on a plurality of light paths relative to the specimen (F:1; C:4 L:6-47). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to provide a movable stage as taught by Takada as the specimen holder of Ntziachristos. The motivation for doing so would have been to improve the physical range over which the specimen may be examined.

Regarding claims 15 and 34, Ntziachristos and Takada disclose the claimed invention but do not disclose expressly that the specimen is selectively movable in a rotation about a specimen rotation axis. However, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to alter the specimen stage of Ntziachristos and Takada to allow for rotation. The motivation for doing so would have been to improve the physical range over which the specimen may be examined.

Regarding claims 16 and 35, Takada disclose that the specimen is selectively movable in translation along at least one specimen translation axis (F:1; C:4 L:6-47).

Regarding claims 17 and 36, Takada disclose that the specimen is selectively movable in translation along at least one specimen translation axis (F:1; C:4 L:6-47), but Ntziachristos and Takada do not disclose expressly that the specimen is selectively movable in a rotation about a specimen rotation axis. However, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to alter the specimen stage of Ntziachristos and Takada to allow for rotation. The motivation for doing so would have been to improve the physical range over which the specimen may be examined.

Regarding claims 18 and 37, Ntziachristos discloses that the apparent light source is selectively moved by a light directing device to move the excitation light on a plurality of light paths toward the specimen (P:18 L:22 thru P:19 L:19). Ntziachristos does not disclose expressly that the specimen is selectively movable to provide the excitation light on a plurality of light paths relative to the specimen. Takada discloses a fluorescent computed tomography system and method comprising: a selectively movable stage upon which the specimen is located and selectively moved that provides the excitation light on a plurality of light paths relative to the specimen (F:1; C:4 L:6-47). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to provide a movable stage as taught by Takada as the specimen holder of Ntziachristos. The motivation for doing so would have been to improve the physical range over which the specimen may be examined.

7. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takada (EP 0336208 A1) in view of Ntziachristos (WO 2002/041760 A2).

Regarding claim 43, Takada discloses a selectively movable stage upon which the specimen is located and selectively moved that provides the excitation light on a plurality of light paths relative to the specimen (F:1; C:4 L:6-47). Takada does not disclose expressly an optical fiber coupled to the selectively movable structure. Ntziachristos discloses a system and method for optical tomography comprising: optical fibers coupled to the specimen stage for receiving emitted light (F:2a, F:3a-3f; P:21 L:23-30). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to employ the optical fibers of Ntziachristos to couple the specimen platform to the detector of Takada. The motivation for doing so would have been to improve the light collection efficiency.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 7,242,997 B2 – Geng discloses a diffuse optical CT system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID S. BAKER whose telephone number is (571)272-6003. The examiner can normally be reached on MTWRF 10:30am-7:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David S Baker/
Examiner, Art Unit 2884

/CHRISTINE SUNG/
Primary Examiner, Art Unit 2884